

# RECLAMATION

*Managing Water in the West*

## Road and Railroad Crossing Inventory

Little Coulee



U.S. Department of the Interior  
Bureau of Reclamation  
Great Plains Region  
Dakotas Area Office

September 2005

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## INTRODUCTION

The Bureau of Reclamation's Dakotas Area Office and the North Dakota State Water Commission are working together in an effort to assist the Devils Lake Joint Water Resources Board in the development and implementation of a sub-basin water management plan for the Devils Lake watershed. Each year since 1999 Reclamation has conducted road/railroad crossing inventory surveys on different tributaries of Devils Lake. The Board requested that an inventory survey be conducted of all road/railroad crossings on Little Coulee as a part of this effort. In August of 2005 the main channel of Little Coulee was surveyed beginning at the confluence with Mauvais Coulee, approximately 5 miles south of Churches Ferry, and continuing upstream to Mylo, approximately 10 miles west of Bisbee. The inventory survey data for Little Coulee is contained in this report. Funding for the inventory surveys has been provided through the Bureau of Reclamation's Technical Assistance to States (TATS) program.

Bureau of Reclamation surveyors collected data on Little Coulee, recording the location of each crossing, the size and type of bridge or culvert, the inlet and outlet invert elevations, top of grade elevation, and relative condition of the structure.

This report includes maps of the crossing locations, photographs of downstream, upstream and center of road or railroad, survey data of the bridge deck, culvert sizes and lengths, relative condition, invert elevations, and channel elevations; in North Dakota State Plane Coordinates, North Zone, NAD 27 and elevations in NGVD 29 at all crossings. Also, a table of all recorded bench marks and temporary bench marks used in the survey control network for this project is included. The state plane coordinates, latitudes, longitudes and elevations for each bench mark are listed.

In an effort to establish comparable elevations throughout the Devils Lake area the State Water Commission has established a new local datum (refer to SWC letter dated 7-28-99) for the Devils Lake area. The new datum, SWC99, is based on the NGVD 29 datum.

For the Little Coulee survey the Bureau of Reclamation survey crew held bench mark elevations and coordinates from previous inventory surveys – Mauvais and Big Coulees 1999. The elevations of bench marks PERTH, PENN and X66 were held as fixed. The coordinates of bench marks PERTH, PENN, CHURCHES and BISBEE were held as fixed. The year 2005 survey of Little Coulee uses the same control networks as previous surveys and will conform to the SWC99 datum. All surveys were performed using G.P.S. fast static and RTK survey methods. Four temporary bench marks (TBM 05-01 LC, TBM 05-02 LC, TBM 05-03 LC and BM J479) were established for this project. Temporary bench marks established by the Bureau of Reclamation for this project are marked by 5/8" rebar with orange plastic caps stamped "USBR."

Reclamation is able to provide this assistance to the Board and State Water Commission through its Technical Assistance program. The Technical Assistance program allows Reclamation to provide assistance to state agencies in water management evaluations they are conducting, at no cost to the state agency. The mission of the Reclamation's Dakotas Area Office is to provide technical assistance and leadership in the responsible development and management of water and related resources to enhance the quality of life in North Dakota and South Dakota.

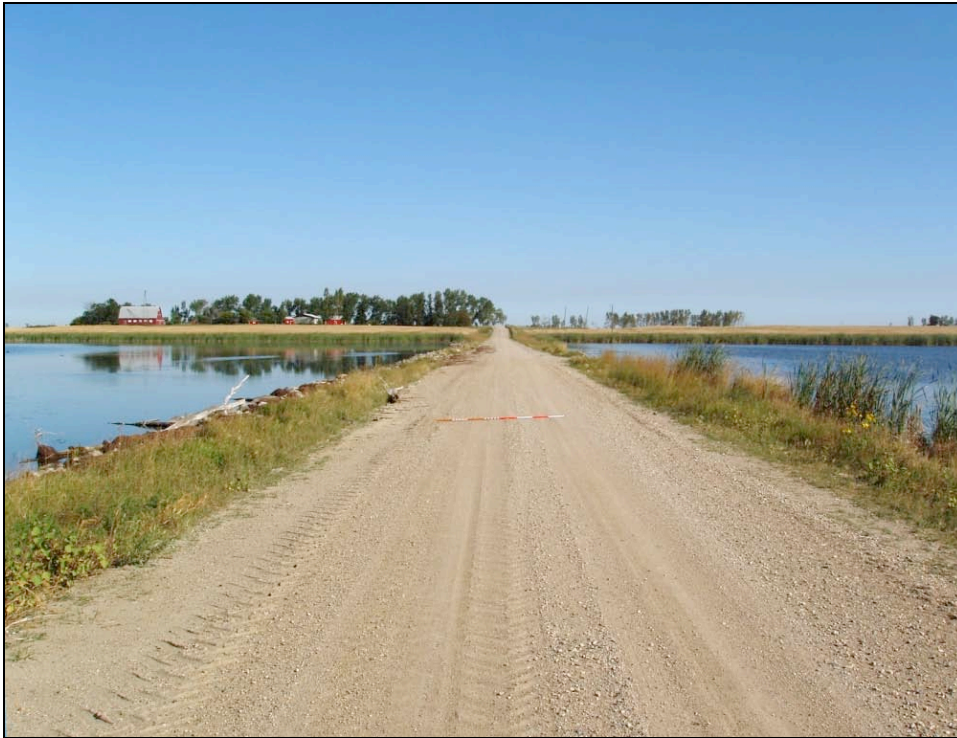


L1 Upstream side of undetermined CMP, in undetermined condition, road going north & south, Silver Lake (09-7-05), Section 2 & 3, T154N, R67W, N 435563.93, E 2306651.80, elevation 1439.9 @ water edge.



L1 Downstream side of undetermined CMP, in undetermined condition, road going north & south, Silver Lake (09-7-05), Section 2 & 3, T154N, R67W, N 435559.30, E 2306608.89, E 1439.8 @ water edge.





L1 Center of road crossing across undetermined CMP, looking north (09-7-05), Section 2 & 3, T154N, R69W, N 435563.44, E 2306632.09, elevation 1441.4 @ center of road crossing, above CMPs, top of gravel.



L2 Upstream side of three 60" CMPs in good condition, CMPs will be replaced with box culverts this year, from north to south (09-7-05), 2.1 feet, 1.5 feet & no water, Section 32 & 33, T155N, R67W, N 442913.51, E 2295904.13, elevation 1442.7 @ invert of CMP, N 442878.72, E 2295914.03, elevation 1443.9 @ invert of CMP, N 442831.59, E 2295911.52, elevation 1445.6 @ invert of CMP.



L2 Downstream side of three 60" CMPs in good condition, CMPs will be replaced with box culverts this year, 1.2 feet, 0.5 feet, & no water, from north to south (09-7-05), Section 32 & 33, T155N, R67W, N 442913.21, E 2295964.33, elevation 1442.5 @ invert of CMP, N 442880.66, E 2295955.00, elevation 1442.9 @ invert of CMP, N 442835.00, E 2295960.47, elevation 1445.4 @ invert of CMP.



L2 Center of road, across three 60" CMPs, looking north, Section 32 & 33, T155N, R67W, N 442878.08, E 2295933.52, elevation 1452.8 @ center of road crossing, top of gravel. Center will change with the replacement of box culverts.





L3 Upstream side of one 60" CMP, in good condition, 1.3 feet of water (09-7-05), Section 30 & 29, T155N, R67W, N 444537.94, E 2290602.03, elevation 1454.2 @ invert of CMP.



L3 Downstream side on one 60" CMP, in good condition, 1.0 feet of water (09-7-05), pipe above water level, Section 30 & 29, T155N, R67W, N 444542.51, E 2290662.61, elevation 1454.1 @ invert of CMP.



L3 Center of road crossing, across one 60" CMP, looking north,  
Section 30 & 29, T155N, R67W, N 444540.82, E 2290635.41, elevation 1464.3  
@ center of road crossing, top of gravel.

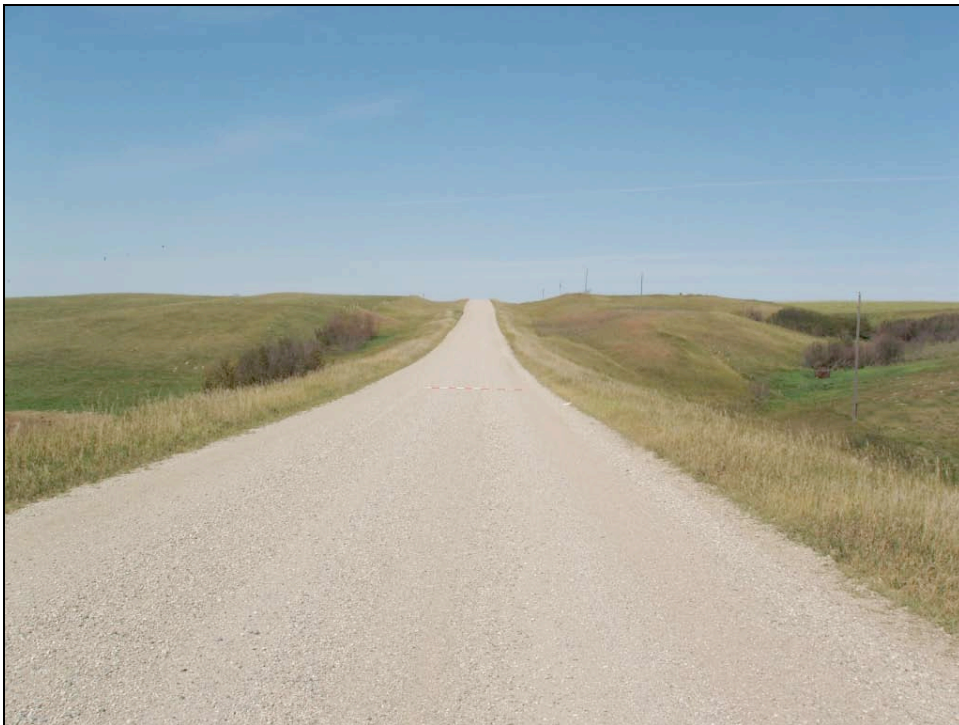


L4 Upstream side of one 180" CMP, in good condition, 1.0 feet of water  
(09-7-05), Section 25 & 30, T155N, R67 & 68W, N 446938.41, E 2285356.36,  
elevation 1465.7 @ invert of CMP.





L4 Downstream side of one 180" CMP, in good condition, 1.1 feet of water (09-7-05), Section 25 & 30, T155N, R67 & 68W, N 446939.41, E 2285484.80, elevation 1464.7 @ invert of CMP.



L4 Center of road crossing, across one 180" CMP, looking north, Section 25 & 30, T155N, R67 & 68W, N 446937.94 E 2285419.48. elevation 1491.9 @ center of road crossing, top of gravel.





L5 Upstream side of wood & concrete bridge, in fair condition, 2.1 feet of water (09-7-05), Section 23 & 24, T155N, R68W, N 451045.74, E 2280055.78, coulee bottom elevation 1469.1 @ C/L of bridge.



L5 Downstream side of wood & concrete bridge, in fair condition, 2.6 feet of water (09-7-05), Section 23 & 24, T155N, R68W, N 451046.08, E 2280079.67, coulee bottom, elevation 1468.6 @ C/L of bridge.





L5 Center of wood & concrete bridge, looking north, in fair condition, 24.1 feet wide & 20.3 feet long, Section 23 & 24, T155N, R68W, N 451046.02, E 2280068.73, elevation 1477.7 @ C/L of bridge, top of wood.



L6 Upstream side of four 48" CMPs in good condition, 2.4 feet, 2.1 feet, 3.4 feet & 3.4 feet of water, from east to west (09-7-05), Section 14 & 23, T155N, R68W, N 453791.66, E 2278875.88, elevation 1470.8 @ invert of 48" CMP, N 453793.23, E 2278868.04, elevation 1471.0 @ invert of 48" CMP, N 453791.97, E 2278858.52, elevation 1469.7 @ invert of 48" CMP, N 453792.04, E 2278850.23, elevation 1469.6 @ invert of 48" CMP.

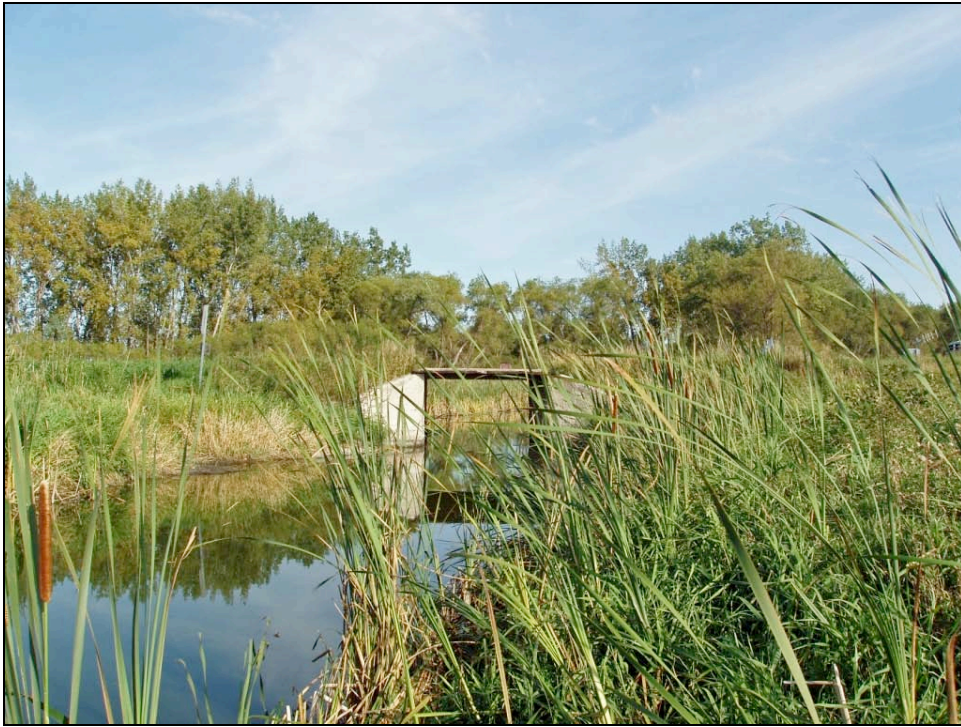




L6 Downstream side of four 48" CMPs in good condition, 2.6 feet, 2.6 feet, 3.8 feet, & 3.8 feet of water, from east to west (09-7-05), Section 14 & 23, T155N, R68W, N 453726.27, E 2278853.47, elevation 1470.4 @ invert of 48" CMP, N 453727.54, E 2278845.16, elevation 1470.4 @ invert of 48" CMP, N 453728.32, E 2278838.03, elevation 1469.3 @ invert of 48" CMP, N 453727.57, E 2278830.79, elevation 1469.2 @ invert of 48" CMP.



L6 Center of road, across four 48" CMPs, looking west, Section 14 & 23, T155N, R68W, N 453758.90, E 2278855.90, elevation 1479.8 @ center of road crossing, top of gravel.

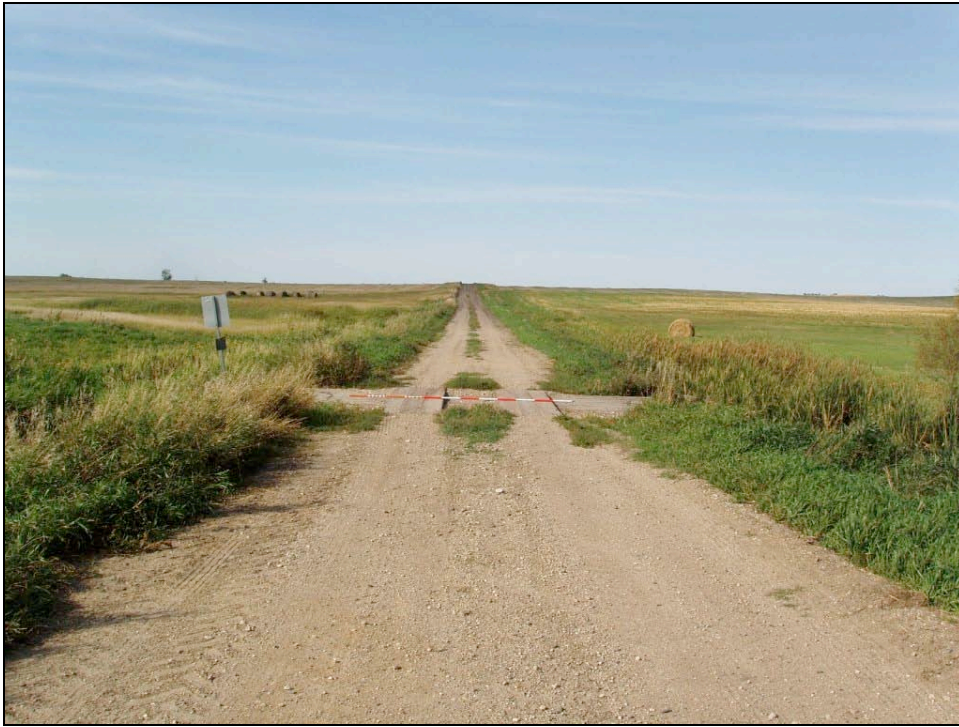


L7 Upstream side of wood & concrete bridge, in fair condition, 1.5 feet of water (09-7-05), Section 15 & 14, T155N, R68W, N 455618.85, E 2274705.52 coulee bottom elevation 1471.4 @ C/L of bridge.



L7 Downstream side of wood & concrete bridge, in fair condition, 1.6 feet of water (09-07-05), Section 15 & 14, T44N, R68W, N 455618.23, E 2274727.74, coulee bottom elevation 1471.2 @ C/L of bridge.





L7 Center of wood & concrete bridge, looking north, in fair condition, 22.3 feet wide & 14.2 feet long, Section 15 & 14, T155N, R68W, N 455618.54, E 2274717.12, elevation 1480.3 @ C/L of bridge, top of wood.



L8 Upstream side of two 108" CMPs, in good condition, 2.1 feet & 2.0 feet of water, from south to north (09-8-05), Section 31 & 32 T156N, R68W, N 469486.70, E 2258651.77, elevation 1473.3 @ invert of 108" CMP, N 469507.63, E 2258652.13, elevation 1473.5 @ invert of 108" CMP.



L8 Downstream side of two 108" CMPs, in good condition, 2.1 feet & 2.0 feet of water, from south to north (09-8-05), Section 31 & 32 T156N, R68W, N 469486.45, E 2258681.85, elevation 1473.5 @ invert of 108" CMP, N 469507.37, E 2258681.67, elevation 1473.5 @ invert of 108" CMP.



L8 Center of road crossing across two 108" CMPs, looking north, Section 31 & 32, T156N, R68W, N 469496.65, E 2258666.85, elevation 1484.1 @ center of road crossing, top of asphalt.





L9 Upstream side of four cell 5 foot Box Culverts, in good condition, 2.2 feet, 2.2 feet, 2.2 feet, & 2.2 feet of water, from east to west (09-8-05), Section 31, T156N, R68W, N 471377.17, E 2256277.40, elevation 1473.4 @ invert of 5' Box Culvert, N 471382.41, E 2256271.74, elevation 1473.4 @ invert of 5' Box Culvert, N 471387.33, E 2256266.51, elevation 1473.4 @ invert of 5' Box Culvert, N 471392.64, E 2256261.15, elevation 1473.4 @ invert of 5' Box Culvert.



L9 Downstream side of four cell 5 foot Box Culverts, in good condition, 2.4 feet, 2.4 feet, 2.4 feet, & 2.4 feet of water, from east to west (09-8-05), Section 31, T156N, R68W, N 471163.15, E 2256234.82, elevation 1473.1 @ invert of 5' Box Culvert, N 471168.51, E 2256229.10, elevation 1473.1 @ invert of 5' Box Culvert, N 471173.92, E 2256223.45, elevation 1473.2 @ invert of 5' Box Culvert, N 471179.26, E 2256217.86, elevation 1473.1 @ invert of 5' Box Culvert.





L9 Center of highway crossing, across four 5 foot box culverts, 31 feet long & 218 feet wide, looking north/west (09-8-05), Section 31, T156N, R68W, N 471219.70, E 2256235.64, elevation 1483.4, & N471336.09, E 2256259.95, elevation 1484.4 @ center lanes of Highway 2 crossings, above centers of box culvert, center of south two lanes, then center of north two lanes.



L10 Upstream side of two cell 5 foot box culverts, 13.5 feet long & 66.0 feet wide, in good condition, 0.6 feet, & 0.6 feet of water @ 2 cell Box Culvert (09-8-05), north to south Section 32, T156N, R68W, N 471923.18, E 2256205.30, elevation 1475.5 @ invert of 5' Box Culvert, N 471923.19, E 2256199.68, elevation 1475.5 @ invert of 5' Box Culvert.



L10 Downstream side of two cell 5 foot box culverts, 13.5 feet long & 66.0 feet wide, in good condition, 0.7 feet, & 0.6 feet of water @ 2 cell box culvert, (09-8-05), north to south Section 32, T156N, R68W, N 471857.32, E 2256206.68, elevation 1475.3 @ invert of 66' Box Culvert, N 471857.58, E 2256200.52, elevation 1475.2 @ invert of 66' Box Culvert.



L10 Center of road crossing across two cell 5' box culvert 13.5 feet long & 66.0 feet wide looking south (09-8-05), Section 31 T156N, R68W, N 471889.34, E 2256203.40, elevation 1482.8 @ center of road crossing, above box culverts, top of asphalt.





L11 Upstream side of two 72" CMPs, in good condition, 1.2 feet, & 0.7 feet of water, from north to south (09-8-05), Section 36 & 31, T156N, R69 & 68W. N 473367.14, E 2253426.34, elevation 1478.0 @ invert of 72" CMP, N 473332.00, E 2253426.64, elevation 1478.6 @ invert of 72" CMP.



L11 Downstream side of two 72" CMPs, in good condition, 0.8 feet, & 0.7 feet of water, from north to south (09-8-05), Section 36 & 31, T156N, R69 & 68W. N 473364.23, E 2253476.97, elevation 1478.2 @ invert of 72" CMP, N 473329.22, E 2253476.52, elevation 1478.2 @ invert of 72" CMP.



L11 Center of road crossing across two 72" CMPs, looking north, Section 36 & 31, T156N, R69 & 68W, N 473345.07, E 2253453.02, elevation 1486.8 @ center of road crossing, above CMPs, top of gravel.



L12 Upstream side of wood & concrete railroad bridge, in good condition, 1.8 feet of water (09-8-05), Section 36, T156N, R69W, N 473704.56, E 2253220.12, coulee bottom elevation 1478.1 @ C/L of bridge.





L12 Downstream side of wood & concrete railroad bridge, in good condition, 1.6 feet of water (09-8-05), Section 36, T156N, R69W, N 473692.37, E 2253218.88, coulee bottom elevation 1478.5 @ C/L of bridge.



L12 Center of wood & concrete railroad bridge, looking west, in good condition, Section 36, T156N, R69W, N 473698.57, E 2253219.64, elevation 1487.3 @ C/L of bridge. top of railroad tie.



L13 Upstream side of wood,& concrete bridge, in fair condition, 4.7 feet of water (09-8-05), Section 25 & 36, T156N, R69W, N 474489.07, E 2252908.15, coulee bottom elevation 1475.3 @ C/L of bridge.



L13 Downstream side of wood & concrete bridge, in fair condition, 4.2 feet of water (09-8-05), Section 25 & 36, T156N, R69W, N 474470.76, E 2252908.66, coulee bottom elevation 1475.8 @ C/L of bridge.





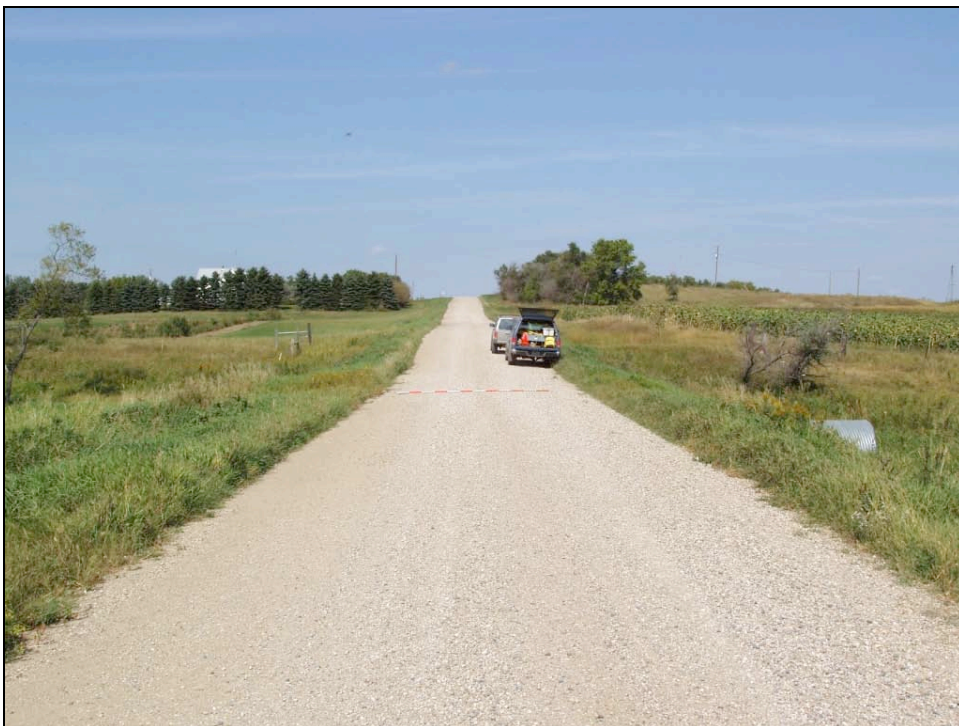
L13 Center of wood, & concrete bridge, looking east, in fair condition, 18.0 feet wide & 15.2 feet wide, Section 25 & 36, T156N, R69W, N 474479.54, E 2252907.74, elevation 1482.4 @ C/L of bridge, top of wood.



L14 Upstream side of three CMPs (48", 72", & 48") in good condition, no water, 0.3 feet & 1.4 feet of water (09-8-05), from south to north, Section 23 & 24, T156N,R69W, N 481052.30, E 2248026.72, elevation 1495.3 @ invert of 48" CMP, N 481134.37, E 2248021.60, elevation 1494.3 @ invert of 72" CMP, N 481190.90, E 2248031.13, elevation 1492.4 @ invert of 48" CMP.



L14 Downstream side of three CMPs (48", 72", & 48") in good condition, no water, 0.3 feet & 1.0 feet of water (09-8-05), from south to north, Section 23 & 24, T156N, R69W, N 481053.55, E 2248076.78, elevation 1495.1 @ invert of 48" CMP, N 481137.91, E 2248081.93, elevation 1493.6 @ invert of 72" CMP, N 481180.48, E 2248074.72, elevation 1492.3 @ invert of 48" CMP.



L14 Center of road crossing, across three CMPs, looking north, Section 23 & 24, T156N, R69W, N 481137.35, E 2248050.57, elevation 1501.9 @ center of road crossing, top of gravel.





L15 Upstream side of two CMPs (48" & 60") in good condition, 0.6 feet, & 1.4 feet of water (09-8-05), from south to north, Section 23 & 24, T156N, R69W, N 483084.58, E 2248049.26, elevation 1499.8 @ invert of 48" CMP, N 483111.37, E 2248047.46, elevation 1499.0 @ invert of 60" CMP.



L15 Downstream side of two CMPs (48" & 60") in good condition, 0.9 feet, & 0.9 feet, of water, from south to north (09-8-05), Section 23 & 24, T156N, R69W, N 483091.36, E 2247986.11, elevation 1499.4 @ invert of 48" CMP, N 483122.51, E 2247987.76, elevation 1499.5 @ invert of 60" CMP.





L15 Center of road, across two CMPs, looking north, Section 23 & 24, T156N, R9W, N 483095.32, E 2248018.43, elevation 1508.5 @ center of road crossing, top of gravel.



L16 Upstream side of four CMPs, the 120" is new & the three 48" are in poor condition, (120", 48", 48", & 48") 0.7 feet & no water in 48" CMPs (09-8-05), from west to east, Section 24, T156N, R69W, N 484269.36, E 2248476.13, elevation 1507.9 @ invert of 120" CMP, N 484237.96, E 2248440.55, elevation 1515.4 @ invert of 48" CMP, N 484242.19, E 2248581.31, elevation 1517.4 @ invert of 48" CMP, N 484240.98, E 2248596.95, elevation 1515.3 @ invert of 48" CMP.



L16 Downstream side of four CMPs, the 120" is new & the three 48" are in poor condition, (120", 48", 48", & 48") 0.8 feet, & no water in the 48" CMPs (09-8-05), from west to east, Section 24, T156N, R69W, N 484150.79, E 2248461.99, elevation 1506.9 @ invert of 120" CMP, N 484155.24, E 2248557.99, elevation 1506.9 @ invert of 48" CMP, N 484156.92, E 2248580.59, elevation 1506.8 @ invert of 48" CMP, N 484158.22, E 2248602.94, elevation 1506.7 @ invert of 48" CMP.



L16 Center of road crossing, across one of 120" CMP, looking east, Section 24, T156N, R69W, N 484209.65, E 2248469.48, elevation 1524.2 @ center of road crossing, top of gravel.



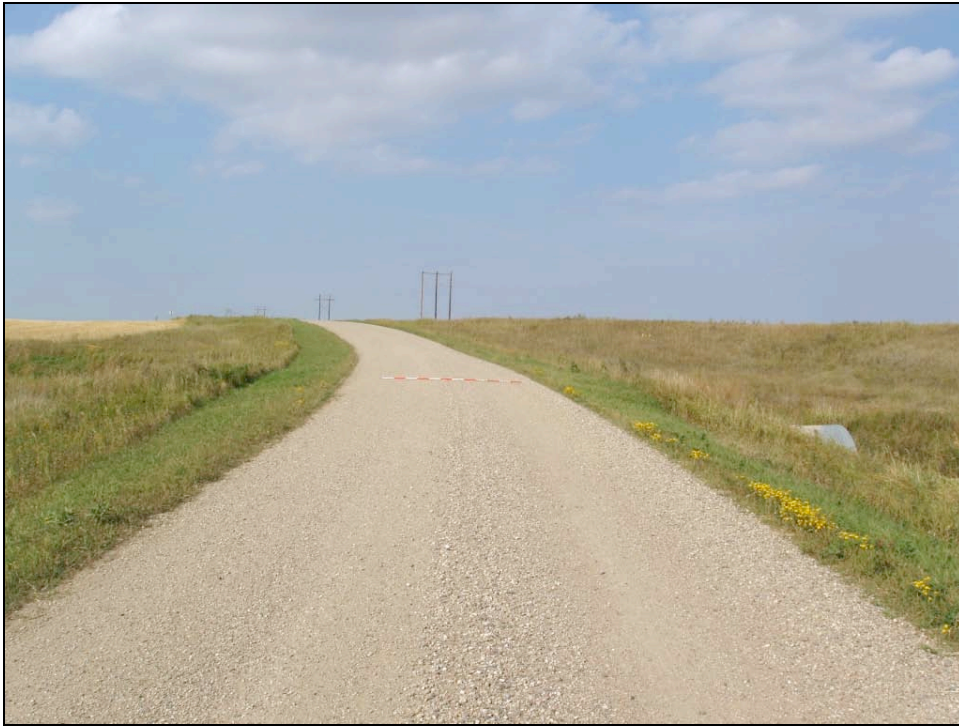


L17 Upstream side of one 108" CMP, in good condition, 0.6 feet of water (09-8-05), Section 14 & 13, T156N, R69W, N 486886.45, E 2247892.06, elevation 1513.1 @ invert of CMP.



L17 Downstream side of one 108" CMP, in good condition, 0.8 feet of water (09-8-05), Section 14 & 13, T156N, R69W, N 486868.02, E 2247969.93, elevation 1511.9 @ invert of CMP.





L17 Center of road crossing across one 108" CMP, looking north, Section 14 & 13, T156N, R69W, N 486875.52, E 2247935.23, elevation 1525.4 @ center of road crossing, across CMP, top of gravel.



L18 Upstream side of two 72" CMPs, in good condition, 1.6 & 1.3 feet of water (09-9-05), east to west, Section 11 & 14, T156N, R69W, N 490315.55, E 2246939.03, elevation 1520.2 @ invert of 72" CMP, N 490316.41, E 2246921.78, elevation 1519.4 @ invert of 72" CMP.



L18 Downstream side of two 72" CMPs, in good condition, 1.4 & 1.0 feet of water (09-9-05), east to west, Section 11 & 14, T156N, R69W, N 490254.99, E 2246935.95, elevation 1519.9 @ invert of 72" CMP, N 490255.55, E 2246920.53, elevation 1519.6 @ invert of 72" CMP.

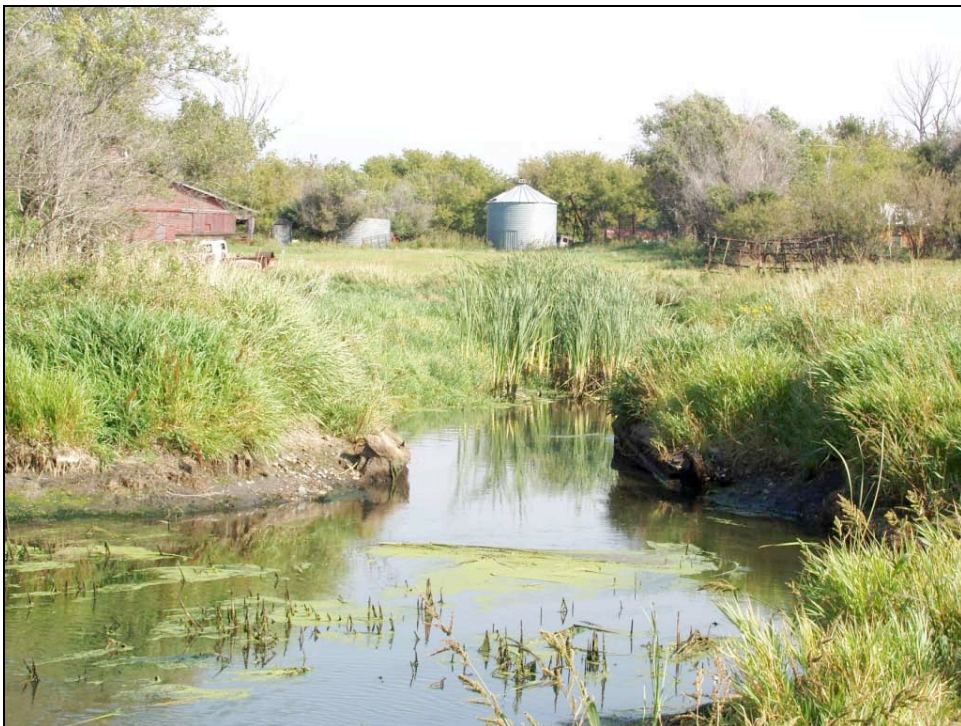


L18 Center of road crossing across two 72" CMPs, looking west, Section 11 & 14, T156N, R69W, N 490280.66, E 2246931.27, elevation 1530.2 @ center of road crossing, between CMPs, top of gravel.





L19 Upstream side of bridge site (09-9-05), Section 2 & 11, T156N, R69W, N 495570.38, E 2246339.13, bottom elevation 1522.6 of bridge site.



L19 Downstream side of bridge site, 30 foot long by 15 feet wide, 1.8 of water in channel (09-9-05), Section 2 & 11, T156N, R69W.





L19 east side of bridge site, looking west, Section 2 & 11, T156N, R69W,  
N 495568.50, E 2246351.86 elevation 1528.5 top elevation of bridge site.



L20 Upstream side of three CMPs in good condition, (48", 60" & 48"),  
no water, 1.4 feet, & 0.9 feet of water (09-8-05) , from south to north,  
Section 2 & 1, T156N, R69W,  
N 499464.95, E 2247808.46, elevation 1529.3 @ invert of 48" CMP,  
N 499489.15, E 2247805.79, elevation 1526.9 @ invert of 60" CMP,  
N 499506.77, E 2247802.97, elevation 1527.6 @ invert of 48" CMP.





L20 Downstream side of three CMPs (48", 60" & 48"), in good condition, no water, 1.3 feet, & 1.2 feet of water (09-8-05) , from south to north, Section 2 & 1, T156N, R69W, N 499427.14, E 2247756.67, elevation 1528.9 @ invert of 48" CMP, N 499450.90, E 2247758.31, elevation 1527.1 @ invert of 60" CMP, N 499474.60, E 2247751.16, elevation 1527.9 @ invert of 48" CMP.



L20 Center of road crossing, across three CMPs, looking north, Section 2 & 1, T156N, R69W, N 499459.38, E 2247781.89, elevation 1535.6 @ center of road crossing, top of gravel.



L21 Upstream side of wood bridge in fair condition, no water, two  
CMPs (48" & 24") in good condition, 1.3 feet & 0.9 feet of water (09-13-05),  
Section 1 & 36, T156 & 157N, R69W,  
N 501777.85, E 2250945.05, coulee bottom elevation 1530.5 @ C/L of bridge,  
N 501791.72, E 2250930.46, elevation 1528.9 @ invert of 48" CMP,  
N 501783.21, E 2250923.82, elevation 1530.3 @ invert of 24" CMP.



L21 Downstream side of wood bridge in fair condition, 0.9 feet of water,  
two CMPs (48" & 24") in good condition, 1.0 feet & 0.6 feet of water (09-13-05),  
Section 1 & 36, T156 & 157N, R69W,  
N 501746.83, E 2250945.32, coulee bottom elevation 1530.5 @ C/L of bridge,  
N 501730.78, E 2250929.56 elevation 1529.1 @ invert of 48" CMP,  
N 501741.97, E 2250923.70 elevation 1530.7 @ invert of 24" CMP.





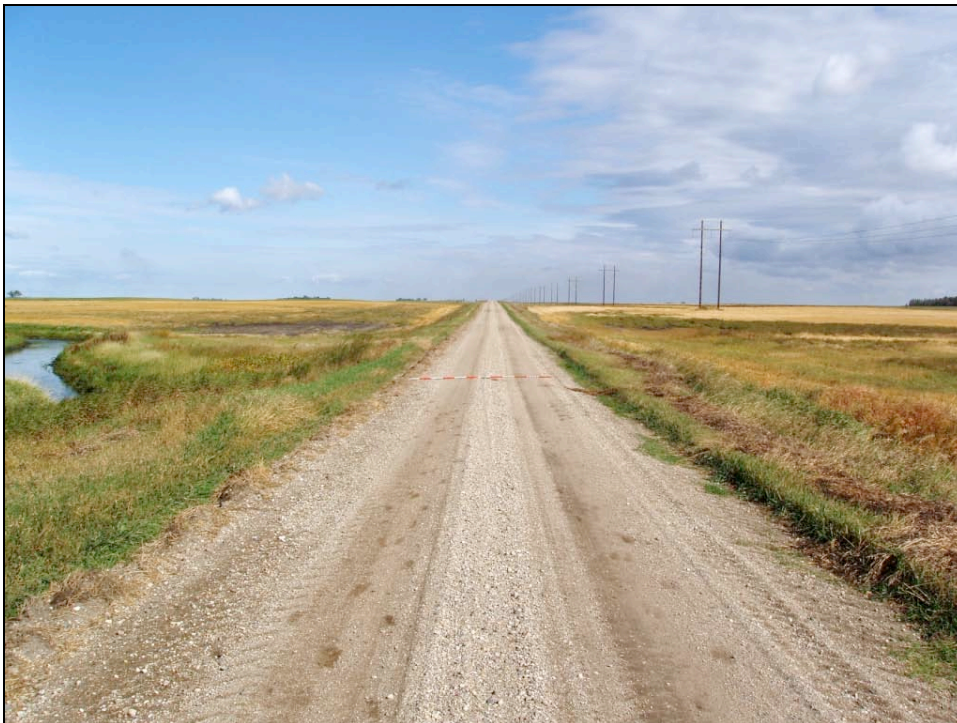
L21 Center of wood bridge, looking west in fair condition, 31.0 feet wide & 13.0 feet long, Section 1 & 36 T156 & 157N, R69WN, 501760.84, E 2250946.54, elevation 1537.0 @ C/L of bridge, top of gravel.



L22 Upstream side of three 48" CMPs in fair condition, 2.0 feet, 1.1 feet, & 1.4 feet of water (09-13-05), from south to north, Section 31 & 32, T157N, R68W, N 503113.80, E 2250030.44, elevation 1529.4 @ invert of 48" CMP, N 503120.32, E 2250034.63, elevation 1530.3 @ invert of 48" CMP, N 503130.07, E 2250033.99, elevation 1529.8 @ invert of 48" CMP.



L22 Downstream side of three 48" CMPs in fair condition, 1.5 feet, 0.9 feet, & 0.8 feet of water (09-13-05), from south to north, Section 31 & 32, T157N, R68W, N 503095.25, E 2250088.69, elevation 1529.9 @ invert of 48" CMP, N 503103.25, E 2250087.04, elevation 1530.5 @ invert of 48" CMP, N 503108.79, E 2250092.04, elevation 1529.5 @ invert of 48" CMP.



L22 Center of road crossing, across three CMPs, looking north, Section 31 & 32, T157N, R68W, N 503112.26, E 2250060.79, elevation 1540.6 @ center of road crossing, top of gravel.





L23 Upstream side of six 48" CMPs in fair condition, 1.0 feet, 1.2 feet, 1.5 feet, 1.3 feet, 1.0 feet, & 1.0 feet of water (09-13-05), from east to west, Section 30 & 31, T157N, R68W,  
N 507024.14, E 2246571.32, elevation 1530.8 @ invert of 48" CMP,  
N 507020.97, E 2246547.57, elevation 1530.4 @ invert of 48" CMP,  
N 507020.36, E 2246533.57, elevation 1530.1 @ invert of 48" CMP,  
N 507019.34, E 2246517.46, elevation 1530.4 @ invert of 48" CMP,  
N 507018.25, E 2246500.91, elevation 1530.8 @ invert of 48" CMP,  
N 507017.14, E 2246481.48, elevation 1530.7 @ invert of 48" CMP,



L23 Downstream side of six 48" CMPs in fair condition, 1.5 feet, 1.4 feet, 1.2 feet, 1.0 feet, 1.2 feet, & 1.0 feet of water (09-13-05), from east to west, Section 30 & 31, T157N, R68W,  
N 506982.63, E 2246574.56, elevation 1530.3 @ invert of 48" CMP,  
N 506980.37, E 2246553.14, elevation 1530.3 @ invert of 48" CMP,  
N 506979.71, E 2246537.76, elevation 1530.6 @ invert of 48" CMP,  
N 506979.09, E 2246522.43, elevation 1530.9 @ invert of 48" CMP,  
N 506977.85, E 2246504.14, elevation 1530.6 @ invert of 48" CMP,  
N 506976.94, E 2246488.25, elevation 1530.8 @ invert of 48" CMP.





L23 Center of road crossing, across six CMPs, looking west, Section 30 & 31, T157N, R68W, N 507000.14, E 2246526.36, elevation 1538.7 @ center of road crossing, top of gravel.



L24 Upstream side of four 60" CMPs in good condition, 2.5 feet, 1.3 feet, 1.0 feet, & 1.2 feet of water (09-13-05), from east to west, Section 23, T158N, R69W, N 546566.51, E 2236781.54, elevation 1534.9 @ invert of 60" CMP, N 546585.41, E 2236734.60, elevation 1536.0 @ invert of 60" CMP, N 546636.94, E 2236649.78, elevation 1536.5 @ invert of 60" CMP, N 546660.22, E 2236608.37, elevation 1536.4 @ invert of 60" CMP.





L24 Downstream side of four 60" CMPs in good condition, 1.8 feet, 1.2 feet, 0.9 feet, & 1.5 feet of water (09-13-05), from east to west, Section 23, T158N, R69W, N 546483.63, E 2236733.63, elevation 1534.6 @ invert of 60" CMP, N 546513.32, E 2236692.52, elevation 1536.1 @ invert of 60" CMP, N 546564.74, E 2236607.48, elevation 1536.5 @ invert of 60" CMP, N 546588.47, E 2236565.22, elevation 1535.9 @ invert of 60" CMP.



L24 Center of road crossing, across four 60" CMPs, looking west Section 23, T158N, R69W, N 546571.10, E 2236677.64, elevation 1544.7 @ center of road crossing @ Hwy 17, top of asphalt.





L25 Upstream side of single cell, 10 foot box culvert, in good condition, 1.6 feet of water (09-13-05), Section 14 & 23, T158N, R69W, N 549181.71, E 2235191.00, coulee bottom elevation 1536.3 @ C/L of box culvert.



L25 Downstream side of single cell 10 foot box culvert, in good condition, 1.5 feet of water (09-13-05), section 14 & 23, T158N, R69W, N 549150.60, E 2235191.35, coulee bottom elevation 1536.2 @ C/L of box culvert.





L25 Center of road crossing, 10.0 feet long box culvert, in good condition, looking west, Section 14 & 23, T158N, R69W, N 549166.16, E 2235191.83, elevation 1549.0 @ center of road crossing, top of gravel.



L26 Upstream side of three CMPs (60", 48" & 60") in good condition, 0.6 feet, 0.8 feet, & 1.1 feet of water (09-13-05), from south to north, Section 15 & 14, T158N, R69W, N 553393.36, E 2233542.09, elevation 1541.8 @ invert of 60" CMP, N 553422.44, E 2233538.15, elevation 1541.5 @ invert of 48" CMP, N 553469.17, E 2233537.22, elevation 1541.1 @ invert of 60" CMP.





L26 Downstream side of three CMPs (60", 48" & 60") in good condition, no water, 1.5 feet, & 1.2 feet of water (09-13-05), from south to north, Section 15 & 14, T158N, R69W, N 553394.38, E 2233592.82, elevation 1542.4 @ invert of 60" CMP, N 553425.02, E 2233594.60, elevation 1540.9 @ invert of 48" CMP, N 553448.69, E 2233595.16, elevation 1541.1 @ invert of 60" CMP.



L26 Center of road crossing, across three CMPs, looking north, Section 15 & 14, T158N, R69W, N 553422.89, E 2233569.38, elevation 1549.0 @ center of road crossing, top of gravel.





L27 Upstream side of Texas crossing, in poor condition, edge of water (09-13-05), Section 10 & 15, T158N, R69W, N 554445.38, E 2233107.68, elevation 1543.4 top of rocks.



L27 Downstream side of Texas crossing, in poor condition, edge of water (09-13-05), Section 10 & 15, T158N, R69W, N 554413.03, E 2233120.56, elevation 1543.5 top of rocks.





L27 Center of Texas crossing, looking east, Section 10 & 15, T158N, R69W, N 554430.97, E 2233115.65, elevation 1543.5 @ center of Texas crossing, top of rocks.



L28 Upstream side of three CMPs (60", 60" & 48") in good condition, 0.8 feet, no water & no water (09-13-05), from west to east, Section 3 & 10, 158N, R69W, N 559688.18, E 2228790.39, elevation 1546.4 @ invert of 60" CMP, N 559690.32, E 2228862.43, elevation 1547.5 @ invert of 60" CMP, N 559691.64, E 2228921.81, elevation 1546.8 @ invert of 48" CMP.



L28 Downstream side of three CMPs (60", 60" & 48") in good condition, 1.5 feet, 0.2 feet & 2.0 feet of water (09-13-05), from west to east, Section 3 & 10, T158N, R69W, N 559649.91, E 2228814.27, elevation 1545.6 @ invert of 60" CMP, N 559649.22, E 2228866.60, elevation 1546.8 @ invert of 60" CMP, N 559654.10, E 2228923.44, elevation 1546.7 @ invert of 48" CMP.



L28 Center of road crossing, across three CMPs, looking east, Section 3 & 10, T158N, R69W, N 559669.94, E 2228864.27, elevation 1553.7 @ center of road crossing, top of gravel.

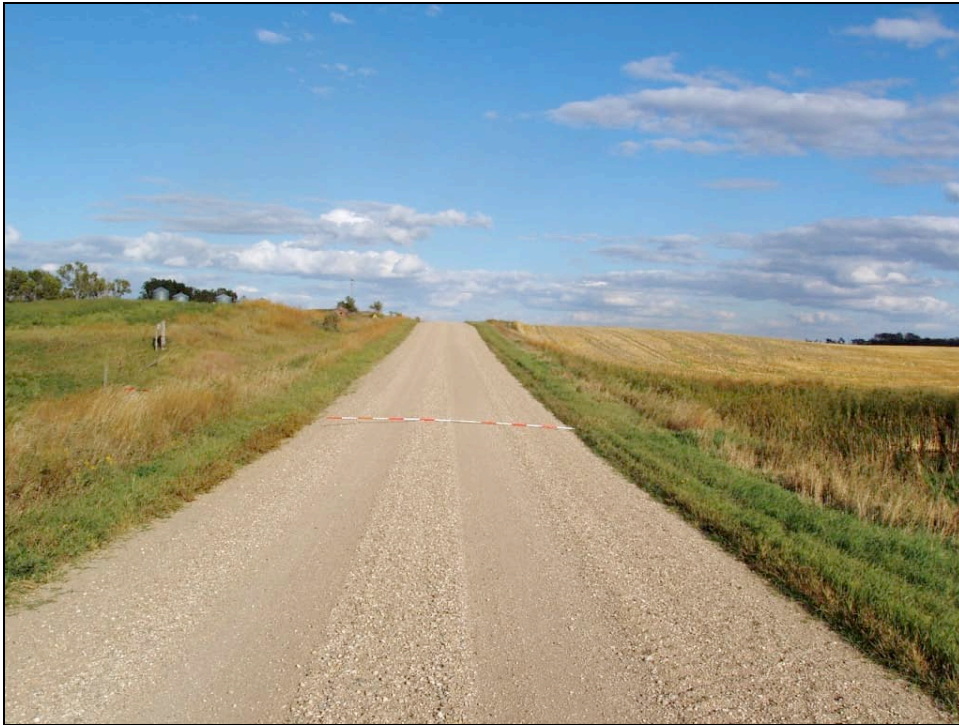




L29 Upstream side of one 84" CMP, in good condition, 2.1 feet of water (09-13-05), Section 4 & 33, T158 & 159N, R69W, N 564957.89, E 2226321.65, elevation 1554.6 @ invert of CMP.



L29 Downstream side of one 84" CMP, in good condition, 1.0 feet of water (09-13-05), Section 4 & 33, T158 & 159N, R69W, N 564895.47, E 2226328.22, elevation 1555.4 @ invert of CMP.



L29 Center of road crossing, across one 84" CMP, looking east, Section 4 & 33, T158 & 159N, R69W, N 564923.32, E 2226323.96, elevation 1565.8 @ center of road crossing, top of gravel.



L30 Upstream side of two (48" & 24") CMPs, in fair condition, south to north, 1.7 feet, & 0.1 feet of water (09-14-05), Section 29 & 28, T159N, R69W, N 575117.15, E 2222726.49, elevation 1566.9 @ invert of 48" CMP, N 575132.15, E 2222729382, elevation 1569.4 @ invert of 24" CMP.





L30 Downstream side of two (48" & 24") CMPs, in fair condition, south to north, 3.7 feet, & 1.6 feet of water (09-14-05), Section 29 & 28, T159N, R69W, N 575114.97, E 2222762.49, elevation 1565.9 @ invert of 48" CMP, N 575128.70, E 2222763.50, elevation 1567.9 @ invert of 24" CMP.



L30 Center of trail crossing across two CMPs (48" & 24"), looking north, Section 29 & 28, T159N, R69W, N 575123.57, E 2222744.59, elevation 1572.3 @ center of trail crossing, top of gravel



L31 Upstream side of three 36" CMPs, in good condition, east to west, 1.4 feet, 0.9 feet of water, & no water (09-14-05), Section 20 & 29, T159N, R69W, N 575461.01, E 2222511.21, elevation 1567.7 @ invert of 36" CMP, N 575464.36, E 2222485.28, elevation 1568.5 @ invert of 36" CMP, N 575460.50, E 2222434.11, elevation 1568.9 @ invert of 36" CMP.



L31 Downstream side of three 36" CMPs, in good condition, east to west, 0.8 feet, 1.5 feet of water, & no water (09-14-05), Section 20 & 29, T159N, R69W, N 575429.30, E 2222510.78, elevation 1568.7 @ invert of 36" CMP, N 575419.56, E 2222481.05, elevation 1567.8 @ invert of 36" CMP, N 575419.97, E 2222439.52, elevation 1569.1 @ invert of 36" CMP.





L31 Center of road crossing across three 36" CMPs, looking west, Section 20 & 29, T159N, R69W, N 575444.02 E 2222482.87, elevation 1573.1 @ center of road crossing, top of gravel.

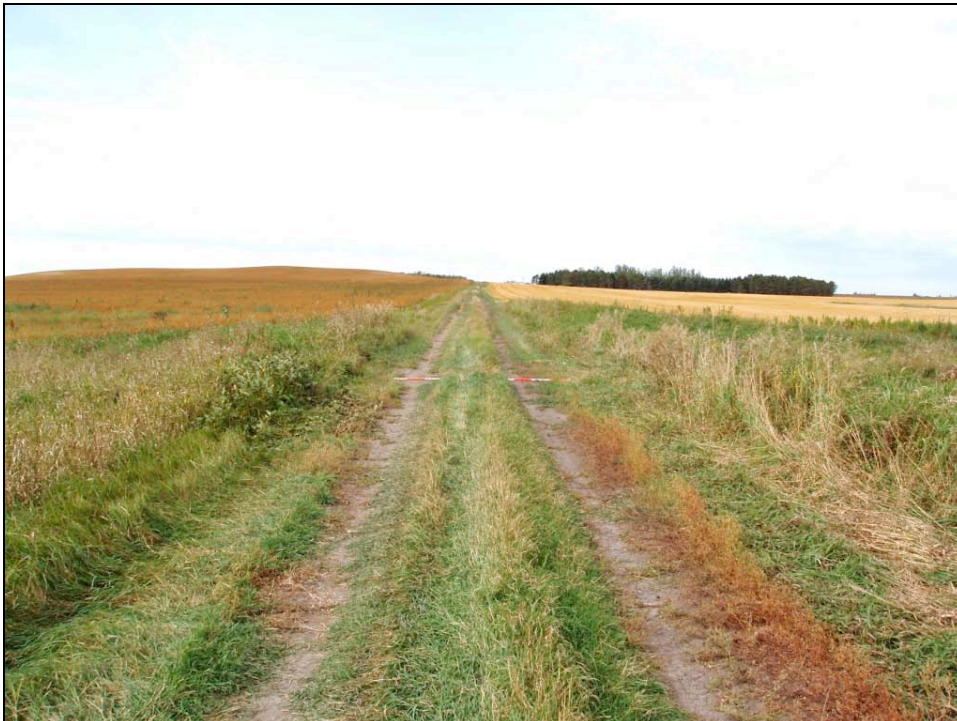


L32 Upstream side of two CMPs (24" & 36") CMPs in good condition, east to west, no water & no water (09-14-05), Section 17 & 20, T159N, R69W, N 580727.52, E 2219605.35, elevation 1576.4 @ invert of 24" CMP, N 580730.56, E 2219594.87, elevation 1575.9 @ invert of 24" CMP.





L32 Downstream side of two CMPs (24" & 36") in good condition, east to west, no water & no water (09-14-05), Section 17 & 20, T159N, R69W, N 580693.62, E 2219607.56, elevation 1576.4 @ invert of 24" CMP, N 580690.08, E 2219592.08, elevation 1575.7 @ invert of 36" CMP.



L32 Center of trail crossing across two CMPS (24" & 36"), looking west, Section 17 & 20, T159N, R69W, N 580710.66, E 2219600.92. elevation 1581.5 @ center of trail crossing, top of ground.





L33 Upstream side of two CMPs (36" & 48"), in good condition, south to north, no water & no water (09-14-05), Section 18 & 17, T159N, R69W, N 581507.09, E 2217352.77, elevation 1582.2 @ invert of 36" CMP, N 581521.94, E 2217352.44, elevation 1580.0 @ invert of 48" CMP.



L33 Downstream side of two CMPs (36" & 48"), in good condition, south to north, no water & no water (09-14-05), Section 18 & 17, T159N, R69W, N 581506.55, E 2217393.42, elevation 1580.9 @ invert of 36" CMP, N 581522.19, E 2217391.25, elevation 1579.5 @ invert of 48" CMP.





L 33 Center of road crossing across two CMPs (36" & 48"), looking north, Section 18 & 17, T159N, R69W, N 581514.93, E 2217372.53, elevation 1587.1 @ center of road crossing, top of gravel.



L34 Upstream side of two CMPs (24" & 48"), in good condition, east to west, no water & no water (09-14-05), Section 7 & 18, T159N, R69W, N 585953.58, E 2215068.24, elevation 1590.6 @ invert of 24" CMP, N 585948.91, E 2215051.13, elevation 1588.9 @ invert of 48" CMP.





L34 Downstream side of two CMPs (24" & 48"), in good condition, east to west, no water & no water (09-14-05), Section 7 & 18, T159N, R69W, N 585912.52, E 2215072.51, elevation 1589.6 @ invert of 24" CMP, N 585924.14, E 2215055.39, elevation 1588.5 @ invert of 48" CMP.



L34 Center of road crossing across two CMPs (24" & 48"), looking west, Section 7 & 18, T159N, R69W, N 585936.42, E 2215062.99, elevation 1594.7 @ center of trail crossing, top of ground.





L35 Upstream side of one 48" CMP, in fair condition, 0.6 feet of water (09-14-05), Section 6 & 7, T159N, R69W, N 591227.68, E 2215083.29, elevation 1600.4 @ invert of CMP.



L35 Downstream side of one 48" CMP, in fair condition, 0.5 feet of water (09-14-05), Section 6 & 7, T159N, R69W, N 591205.29, E 2215062.03, elevation 1600.6 @ invert of CMP.





L35 Center of trail crossing across one 48" CMP, looking west,  
Section 6 & 7, T159N, R69W, N 591216.03, E 2215071.13, elevation 1605.5  
@ center of trail crossing, top of ground.



L36 Upstream side of one 48" CMP, in fair condition, 0.2 feet of water  
(09-14-05), Section 31 & 6, T159 & 160N, R69W, N 596531.05,  
E 2215658.84, elevation 1613.5 @ invert of CMP.





L36 Downstream side of one 48" CMP, in fair condition, no water (09-14-05),  
 Section 31 & 6, T159 & 160N, R69W, N 596498.57, E 2215656.95,  
 elevation 1613.2 @ invert of CMP.



L36 Center of road crossing, across one 48" CMP, looking west,  
 Section 31 & 6, T159 & 160N. R 69W, N 596514.03, E 2215659.40,  
 elevation 1619.6 @ center of road crossing, top of gravel.





L37 Upstream side of one 48" concrete pipe, in good condition, 3.6 feet of water (09-14-05), Section 31, T160N, R69W, N 596779.07, E 2215819.44, elevation 1612.9 @ invert of concrete pipe.



L37 Downstream side of one 48" concrete pipe, in good condition, 4.0 feet of water (09-14-05), Section 31, T160N, R69W, N 596706.40, E 2215795.97, elevation 1612.6 @ invert of concrete pipe.





L37 Center of railroad crossing across one 48" concrete pipe, looking north/west  
Section 31, T160N, R69W, N 596740.62, E 2215806.30,  
elevation 1631.4 @ center of railroad crossing, top of gravel.



L38 Upstream side of two 36" CMPs, in fair condition, no water & no water  
(09-14-05), Section 31, T160N R69W,  
N 596870.30, E 2215881.85, elevation 1617.0 @ invert of 36" CMP,  
N 596872.69, E 2215879.71, elevation 1617.0 @ invert of 36" CMP.





L38 Downstream side of two 36" CMPs, in fair condition, no water & no water Section 31, T160N R69W,  
 N 596820.41, E 2215868.88, elevation 1616.9 @ invert of 36" CMP,  
 N 596820.73, E 2215863.58, elevation 1616.8 @ invert of 36" CMP.



L38 Center of road crossing across two 36" CMPs, looking north/west (09-14-05), Section 31, T160N, R69W, N 596845.19, E 2215874.19,  
 elevation 1624.5 @ center of road crossing, top of gravel.



L39 Upstream side of one 48" concrete pipe, in good condition, 0.1 feet of water, Section 31, T160N, R69W, N 597370.64, E 2216239.40, elevation 1620.0 @ invert of concrete pipe.



L39 Downstream side of one 48" concrete pipe, in good condition, no water (09-14-05), Section 31, T160N, R69W, N 597285.381, E 2216175.27, elevation 1619.4 @ invert of concrete pipe.





L39 Center of Highway 66 crossing, across one 48" concrete pipe, looking north/east, Section 31, T160N, R69W, N 597327.24, E 2216212.61, elevation 1633.7 @ center of Highway 66, top of asphalt.



L40 Upstream side of one 36" CMP, in fair condition, 0.2 feet of water (09-14-05), Section 31 & 32, T160N, R69W. N 597877.57, E 2217162.08, elevation 1622.2 @ invert of CMP.





L40 Downstream side of one 36" CMP, in fair condition, 1.2 feet of water (09-14-05), Section 31 & 32, T160N, R69W. N 597863.14, E 2217135.64, elevation 1621.2 @ invert of CMP.



L40 Center of trail crossing across one 36" CMP, looking north, Section 31 & 32, T160N, R69W, N 597872.54, E 2217150.70, elevation 1626.6 @ center of trail crossing, top of ground.



Bench Marks Used  
Datum NAD 83

	Designation	Latitude	Longitude	Ellipsoid Height	Description
1	BM PENN	<b>48°14'17.52378"N</b>	<b>99°08'10.52894"W</b>	1380.890	NGS Cap
2	BM CHURCHS	<b>48°16'43.04508"N</b>	<b>99°17'35.08512"W</b>	1436.778	NGS Cap
3	BM J479"	48°17'17.83028"N	99°26'00.59698"W	1440.065	NGS Cap
4	BM BISBEE	<b>48°37'52.90900"N</b>	<b>99°22'51.27111"W</b>	1527.158	NGS Cap
5	BM PERTH	<b>48°45'31.17816"N</b>	<b>99°30'14.20818"W</b>	1688.458	NGS Cap
6	BM X66	48°49'01.41861"N	99°34'11.64273"W	1710.748	NGS Cap
7	TBM 05-01 LC	48°13'26.28565"N	99°19'47.96373"W	1474.749	Rebar/Cap
8	TBM 05-02 LC	48°32'42.24427"N	99°33'45.38977"W	1526.812	Rebar/Cap
9	TBM 05-03 LC	48°22'15.69039"N	99°27'52.04999"W	1487.406	Rebar/Cap

\* Bold numbering is current survey control held, Points 3, 7, 8 & 9 were surveyed in WGS 84  
(done by G.P.S. Fast Static Survey)

Bench Marks Used  
Local Coordinates  
Datum NAD 27 & NGVD 29

	Designation	Northing	Easting	Elevation	Description
1	BM PENN	<b>454600.205</b>	<b>2332423.159</b>	1457.25	NGS Cap
2	BM CHURCHS	<b>468706.831</b>	<b>2293980.624</b>	1502.34	NGS Cap
3	BM J479	471725.752	2259744.894	1496.09	NGS Cap
4	BM BISBEE	<b>597050.949</b>	<b>2270727.098</b>	<b>1601.26</b>	NGS Cap
5	BM PERTH	<b>643080.516</b>	<b>2240375.612</b>	<b>1761.54</b>	NGS Cap
6	BM X66	664187.184	2224209.866	<b>1783.09</b>	NGS Cap
7	TBM 05-01 LC	448632.260	2285298.069	1535.72	Rebar/Cap
8	TBM 05-02 LC	564984.165	2227175.264	1584.60	Rebar/Cap
9	TBM 05-03 LC	501802.911	2251801.369	1544.78	Rebar/Cap

\* Bold numbering is current survey control held, due to inaccuracy of NAD 27 Datum, the coordinates for Bench Marks will vary slightly, dependent upon which NAD control point is used. All points done by G.P.S. Fast Static Survey, then calculated to North Dakota Coordinate system, north zone, 1927 North American datum, elevation base on NGVD 29 datum.